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THE DISTRIBUTION AND STATUS OF THE INDIANA CRAYFISH, ORCONECTES INDIANENSIS

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Center for Biodiversity
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# The Distribution and Status of the Indiana Crayfish, *Orconectes indianensis*

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Summary

The Indiana crayfish, *Orconectes indianensis*, is restricted in its distribution to southeastern Illinois and southwestern Indiana. Because the species has been extirpated from a large portion of its historic range in Illinois and has been reported from very few sites in Indiana, the species is being considered for listing by the U.S. Fish and Wildlife Service as a federally protected species. The goal of this study was to determine the distribution of the species throughout its range and determine its need for protection. Available habitat and life history information was summarized because of the potential need for management plans.

No unreported collections of *O. indianensis* from Illinois were found in museums. Unreported collections of *O. indianensis* from Indiana were found in the United States National Museum (USNM), the Ohio State University Museum of Biological Diversity (OSUM), and the Illinois Natural History Survey (INHS). In addition to the published records for Gibson and Dubois counties (Hay 1896, Eberly 1955), old records were found for Perry, Posey, Spencer, and Vanderburgh counties.

All 9 localities in Illinois where the Indiana crayfish had been found between 1972 and 1982 (Page 1985) were revisited in 1993. The species was found at all but two of the sites, and the status of the species appears to be the same as in the 1970's-80's. *Orconectes indianensis* is fairly common within a limited portion of the Saline River system in Gallatin, Hardin, Johnson, Pope, Saline, and Williamson counties, and is common in Honey and Rock creeks, small tributaries of the Ohio River in Hardin County. A collection of *O. indianensis* from Brushy Slough, a tributary of the Wabash River in White County, is the only known locality for the species in the Wabash River drainage of Illinois.

All four localities in Indiana where the Indiana crayfish had been found prior to 1974 were revisited in 1993, and 27 new sites were visited. The species was found at three of the four historical sites and at seven of the 27 new sites. The Indiana crayfish is common and widely distributed in extreme southwestern Indiana in the Patoka River system, a tributary of the Wabash River, in Black River, a small tributary of the Wabash River in Posey County, and in Ohio River tributaries from Pigeon Creek in Vanderburgh County to Anderson River in Perry County. The species is known from localities in Crawford, Dubois, Gibson, Orange, Perry, Pike, Posey, Spencer, Vanderburg, and Warrick counties. In Indiana drainages to the east and north, the Indiana crayfish is replaced by *Orconectes putnami*.

The Indiana crayfish always was found among coarse substrate, primarily large rocks or woody debris, and usually was found in slow to moderate current. Very few individuals were found in quiet water or over sand and mud away from rocks or woody debris, and none was found in burrows. All were collected
in water less than 50 cm deep; most were found in water less than 30 cm deep. A few individuals were found among or near emergent or submerged vegetation; however, aquatic vegetation was absent or uncommon at most localities and did not appear to be an important predictor of *O. indianensis*.

From published data and collections made in 1993, it appears that fertilization can occur in spring, summer, or fall, and that eggs are laid the following spring. Females carrying eggs have been found in March and April, and a female with young attached was collected in May. Sex ratios varied markedly among samples. The largest Indiana collection, from Bacon Creek (Patoka River drainage), 14 July 1993, contained 24 males and 12 females; the second largest collection, from a tributary of Patoka River, 5 mi. SW French Creek, contained 10 males and 12 females. Of the 219 *O. indianensis* collected in Illinois, 104 were males and 115 were females. The largest known *O. indianensis* from Illinois or Indiana is a 35.0-mm carapace length female; the largest male is a 33.4-mm carapace length form I male. Maximum longevity for the species is probably two or three years.

Contrary to earlier indications, the Indiana crayfish is common in southern Indiana and presently is not in need of special protection by the State of Indiana. Likewise, because of its widespread distribution in southern Indiana, it does not require special protection by the federal government. The populations studied from 1972 to 1982 in Illinois appear to be about as large as they were in 1972-1982. However, the present range in Illinois is much smaller than the historical range, the Saline River system (the mainstay of the Indiana crayfish in Illinois) remains woefully degraded, and protection in Illinois as a state endangered species remains necessary.

The following 17 species and subspecies have been reported for Indiana. *Procambarus acutus*, *Procambarus gracilis*, *Procambarus clarkii*, *Orconectes propinquus*, *Orconectes indianensis*, *Orconectes immunis*, *Orconectes inermis inermis*, *Orconectes inermis testii*, *Orconectes virilis*, *Orconectes putnami*, *Orconectes rusticus*, *Orconectes sloanii*, *Cambarus ortmanni*, *Cambarus laevis* (synonym of *Cambarus tenebrosus*?), *Cambarus diogenes*, *Cambarus robustus*, and *Fallicambarus fodiens*.

Among the species presently known for the state, the two rarest crayfishes in Indiana are probably *Procambarus clarkii* and *P. gracilis* (although the status of the troglobitic *O. inermis inermis* and *O. inermis testii* are difficult to determine). *P. clarkii* is restricted to extreme southwestern Indiana and, in fact, may be found only in swampy streams in Posey, Vanderburgh, and Warrick counties.

*Procambarus gracilis* is known in Indiana only from collections on the Indiana-Illinois state line and may be the rarest crayfish in Indiana. Additional collecting is needed in the Indiana counties bordering Illinois that are drained by the Kankakee, Iroquois, and Wabash rivers to assess the need for protection of this species in Indiana.
Introduction

The Indiana crayfish, *Orconectes indianensis*, is restricted in its distribution to southeastern Illinois and southwestern Indiana (Hobbs 1989). The distribution and status of the species in Illinois recently was documented as part of a statewide survey of crayfishes (Page 1985). Page (1985) studied the limited distribution of the Indiana crayfish in Illinois and discussed the recent elimination of the species from a significant portion of its historic range as a result of habitat degradation. Because of the reduction in its range, the Indiana crayfish is protected as an endangered species in Illinois.

In contrast to its status in Illinois, the distribution of the Indiana crayfish in Indiana has been poorly known, with records published for only two localities: the type-locality for the species, Patoka River at Patoka, Gibson Co., and Huntingburg, Dubois Co., (Hay 1896, Eberly 1955).

Because the Indiana crayfish has been extirpated from a large portion of its historic range in Illinois and has been reported from very few sites in Indiana, the species is being considered for listing by the U.S. Fish and Wildlife Service as a federally protected species. The goal of this study was to determine the distribution of the species throughout its range and determine its need for protection. Available habitat and life history information was summarized because of the potential need for management plans.

Objectives

1. To sample suitable habitat in southwestern Indiana for *Orconectes indianensis*. Other crayfish species were sampled at the same time to determine their distributions and demographic status in southwestern Indiana.

2. To resample known localities for *Orconectes indianensis* in southeastern Illinois to determine the demographic status of the species in Illinois.

3. To record habitat and demographic characteristics of *Orconectes indianensis*, including observations on sex ratios and seasonal variation in the presence of form I and II males and females with eggs or young attached.

4. To review all museum records and examine specimens of *Orconectes indianensis* to determine the historical and present ranges of the species.

5. Assess the conservation status of *Orconectes indianensis* throughout its range and make recommendations relative to its protection.
Procedures

Small to medium-sized streams in southwestern Indiana (Crawford, Dubois, Gibson, Orange, Perry, Pike, Posey, Spencer, Vanderburgh, and Warrick counties) were sampled for Orconectes indianensis. Known populations of Orconectes indianensis in Illinois were examined to determine population changes since 1985 and to evaluate their current status. Various collecting methods, including seining, dipnetting, trapping, and digging into stream substrate and stream banks were used to find different species of crayfishes. No chemicals were used in sampling. Voucher specimens (at least one individual of each species found at a site) were returned to the Illinois Natural History Survey for identification and analysis of sex and reproductive condition. At each site sampled, habitat characteristics, including water depth, substrate composition, aquatic vegetation, and type of riparian habitat (e.g., presence of trees, grasses, shrubs, cropland) were noted. Habitats were photographed as sampled for later reference. Fieldwork was conducted between 18 April 1993 and 26 September 1993.

Curators at North American museums known to have collections of crayfishes were contacted concerning their holdings of Orconectes indianensis. Questionable specimens were examined and identified to species.

Results

Distribution and Status in Illinois

Museum records
No unreported (Page 1985) collections of O. indianensis from Illinois were found in museums (Appendix 1).

Field work in 1993
All 9 localities in Illinois where the Indiana crayfish had been found between 1972 and 1982 (Page 1985) were revisited in 1993, and one additional site was visited (Appendix 2). The species was found at all but two of the sites, and the status of the species appears to be the same as in the 1970’s-80’s. The two sites where O. indianensis was not found did not appear to be particularly degraded, and additional collecting would probably show the species still to be present at these sites.

Orconectes indianensis is fairly common within a limited portion of the Saline River system in Gallatin, Hardin, Johnson, Pope, Saline, and Williamson counties, and is common in Honey and Rock creeks, small tributaries of the Ohio River in Hardin County.
A collection of *O. indianensis* made in 1987 in Brushy Slough, a tributary of the Wabash River in White County, is the only known locality for the species in the Wabash River drainage of Illinois. Although the locality could not be field-verified in 1993, voucher specimens for the 1987 collection are housed at the Illinois Natural History Survey and the record is considered valid.

The range of the Indiana crayfish in Illinois is shown in Figure 1.

**Distribution and Status in Indiana**

**Museum records**

Collections of *O. indianensis* from Indiana (Appendix 1) were found in the United States National Museum (USNM), the Ohio State University Museum of Biological Diversity (OSUM), and the Illinois Natural History Survey (INHS). In addition to the published records for Gibson and Dubois counties (Hay 1896, Eberly 1955), old records were found for Perry, Spencer, Posey, and Vanderburgh counties.

**Field work in 1993**

All four localities in Indiana where the Indiana crayfish had been found prior to 1974 were revisited in 1993, and 27 new sites were visited (Appendix 2, Figure 2). The additional sites were within the potential range of the species and appeared to have appropriate habitat. The species was found at three of the four historical sites and at seven of the 27 new sites.

The Indiana crayfish is common and widely distributed in extreme southwestern Indiana in the Patoka River system, a tributary of the Wabash River, in Black River, a small tributary of the Wabash River in Posey County, and in Ohio River tributaries from Pigeon Creek in Vanderburgh County to Anderson River in Perry County. The species is known from localities in Crawford, Dubois, Gibson, Orange, Perry, Pike, Posey, Spencer, Vanderburg, and Warrick counties. In Indiana drainages to the east and north, the Indiana crayfish is replaced by *Orconectes putnami*.

The distribution of all known localities for *O. indianensis* in Indiana is shown in Figure 3. Localities include museum records and records from 1993 field work.

**Habitat and Demographic Characteristics**

The Indiana crayfish always was found among coarse substrate, primarily large rocks or woody debris (Figure 4), and usually was found in slow to moderate current. Very few individuals were found in quiet water or over sand and mud away from rocks or woody debris, and none were found in burrows. All were collected in water less than 50 cm deep; most were found in water less than 30 cm deep. A few individuals were found among or near emergent or
Figure 1.--Distribution of the Indiana crayfish in Illinois.
Open circles are pre-1912 records.
Black dots are 1972-1993 records.
Figure 2.—Distribution of 1993 collecting stations in Indiana.
Figure 3.—Distribution of the Indiana crayfish in Indiana.
Figure 4.--The Indiana crayfish (top; trib., Patoka River, 5 mi. SW French Lick, Orange County, Indiana, 14 July 1993) inhabits small streams and usually is found among coarse substrate such as large rocks or woody debris in slow to moderate current (bottom; Bacon Creek, Bacon, Orange County, Indiana, 14 July 1993).
submerged vegetation; however, aquatic vegetation was absent or uncommon at most localities and did not appear to be an important predictor of *O. indianensis*.

Most of the streams in which the Indiana crayfish is found flow through land that is, or was, forested. At most localities where the species was found in 1993, the stream banks remained forested for at least a few meters from the edge of the water. Streams where the trees had been removed to the edge of the water characteristically were more turbid, had muddier bottoms, and had less suitable habitat for *O. indianensis*.

Other crayfishes collected with the Indiana crayfish were *Orconectes immunis*, *Procambarus acutus*, *Procambarus clarkii*, and *Cambarus diogenes* in Indiana, and *Orconectes immunis*, *Orconectes virilis*, *Procambarus acutus*, and *Cambarus diogenes* in Illinois. *Orconectes immunis*, *Procambarus clarkii*, and *Procambarus acutus* live in quiet pools over mud and sand. *Cambarus diogenes* is a burrowing species, found most often on shore within a few feet of a stream. *Orconectes virilis* has been introduced into the Saline River system of Illinois, probably as a result of its common use as fishing bait; it does not occur naturally with the Indiana crayfish. Its habitat requirements are similar to those of *O. indianensis*, i.e., it lives nears rocks and woody debris in the current but prefers slightly quieter water than does *O. indianensis*. It may compete with *O. indianensis* and further add to the decline of *O. indianensis* in the Saline River system.

The Indiana crayfish is poorly known ecologically. The only information available is that on Illinois specimens examined by Brown (1955) and Page (1985). Form I (reproductively mature) males are known from March, August, September, October and November. The smallest form I male recorded was 17.7 mm carapace length, and the largest was 33.4 mm carapace length. Females carrying eggs have been found in March and April, and a female with young attached was collected in May (Page 1985). In our 1993 collections, we encountered form I males in June and July. No females with eggs or young attached were found. From these data, it appears that fertilization can occur in spring, summer, or fall, and that eggs are laid the following spring.

Sex ratios varied markedly among samples and, given the small size of the samples, were clearly subject to sampling error. The largest Indiana collection, from Bacon Creek (Patoka River drainage), 14 July 1993, contained 24 males and 12 females; the second largest collection, from a tributary of Patoka River, 5 mi. SW French Creek, contained 10 males and 12 females. Of the 219 *O. indianensis* collected in Illinois, 104 were males and 115 were females (Page 1985).

The largest known *O. indianensis* from Illinois or Indiana is a 35.0-mm carapace length female; the largest male is a 33.4-mm carapace length form I male (Page 1985). Based on size distribution, all individuals encountered were in their first or second year of life; maximum longevity for the species is probably two or three years. The life history of *O. indianensis* is probably similar to that of *Orconectes kentuckiensis* (Boyd and Page 1978), another inhabitant of small rocky streams in the Shawnee Hills of southern Illinois.
Recommendations for Protection of Indiana Crayfish

Contrary to earlier indications, the Indiana crayfish is common in southern Indiana and presently is not in need of special protection by the State of Indiana. Likewise, because of its widespread distribution in southern Indiana, it does not require special protection by the federal government. The populations studied from 1972 to 1982 (Page 1985) in Illinois appear to be about as large as they were in 1972-1982. However, the present range in Illinois is much smaller than the historical range, the Saline River system (the mainstay of the Indiana crayfish in Illinois) remains woefully degraded, and protection in Illinois as a state endangered species remains necessary.

The Distributions of Crayfishes in Indiana

Little is known about the distributions of crayfishes in Indiana. The most complete information is contained in checklists for Indiana by Hay (1896) and Eberly (1955), and in the checklist for North America by Hobbs (1989).

The following 17 species and subspecies have been reported for Indiana.

- *Procambarus acutus*
- *Procambarus gracilis*
- *Procambarus clarkii*
- *Orconectes propinquus*
- *Orconectes indianensis*
- *Orconectes immunis*
- *Orconectes inermis inermis*
- *Orconectes inermis testii*
- *Orconectes virilis*
- *Orconectes putnami*
- *Orconectes rusticus*
- *Orconectes sloanii*
- *Cambarus ortmanni*
- *Cambarus laevis* (synonym of *Cambarus tenebrosus?*)
- *Cambarus diogenes*
- *Cambarus robustus*
- *Fallicambarus fodiens*.

Other crayfish species were sampled with *O. indianensis* in order to elucidate their distributions in southwestern Indiana. Appendix 2 gives additional Indiana localities for *Orconectes immunis*, *Orconectes indianensis*, *Procambarus acutus*, *Procambarus clarkii*, and *Cambarus diogenes*.

According to Hobbs (1989), the range of *Orconectes putnami* is uncertain, and he only tentatively listed the species for Indiana. We found populations assignable to *O. putnami* to be widespread in southeastern Indiana. However, as has been noted elsewhere (Ortmann 1931, Rhoades 1944, Hobbs 1989) the
taxonomy of *O. putnami* and its closest relatives is uncertain, and the species in Indiana may be more correctly referred to as *Orconectes spinosus*. Additional study is needed to determine the correct name of populations in Indiana.

According to Jezerinac (1993), populations of crayfishes in Indiana usually referred to as *Cambarus diogenes* are actually a complex of two species; one is assignable to *C. diogenes* and the other is an unnamed species. Recognition of the undescribed species brings the number of species and subspecies of crayfishes in Indiana to 18.

Among the species presently known for the state, the two rarest crayfishes in Indiana are probably *Procambarus clarkii* and *P. gracilis* (although the status of the troglobitic *O. inermis inermis* and *O. inermis testii* are difficult to determine). *P. clarkii* is restricted to extreme southwestern Indiana and, in fact, may be found only in swampy streams in Posey, Vanderburgh, and Warrick counties. The species is common elsewhere, especially on the Coastal Plain of southern states where it is harvested for human consumption.

*Procambarus gracilis* is known in Indiana only from collections on the Indiana-Illinois state line (Page 1985) and may be the rarest crayfish in Indiana. Additional collecting is needed in the Indiana counties bordering Illinois that are drained by the Kankakee, Iroquois, and Wabash rivers to assess the need for protection of this species in Indiana.

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Literature Cited


Appendix 1.--Pre-1993 Museum Records of *Orconectes indianensis*.

### Illinois

1. USNM 0-0054-25. Sugar Creek, 2 mi. NE Creal Springs, Williamson County, Illinois, 1954 (N=1)

2. USNM 0-0054-24. South Fork Saline River, 1 mi S New Dennison, Williamson County, Illinois, 1954 (N=2)

[Following are all INHS Collections (uncatalogued)]

3. Eagle Creek, 1.5 mi. N Leamington at defunct bridge crossing, T10S, R8E, sec. 10, Gallatin County, 11 May 1988 (N=2)

4. Robinette Creek, Pounds Hollow, T10, R8E, sec. 25, Gallatin County, 7 July 1974 (N=1)

5. Honey Creek, 1 mi E of Lamb, T11S, R10E, sec. 28, Hardin County, 19 October 1972 (N=37), 23 March 1973 (N=51), 9 April 1981 (N=35)

6. Sheridan Branch, 3 mi N Cave-in-Rock, T11S, R9E, sec. 36, Hardin County, 30 September 1975 (N=1)

7. Rock Creek, 3 mi S Cadiz, T11S, R9E, sec. 29, Hardin County, 16 April 1973 (N=2)

8. Clifty Creek, 2 mi E New Burnside, T11S, R4E, sec. 12, Johnson County, 19 May 1973 (N=12)

9. Burden Creek, 2 mi NE McCormick, T11S, R5E, sec. 15, Pope County, 19 May 1973 (N=2)

10. Rock Branch (Battle Ford Creek Dr.), 4 mi SW Mitchellville, T10S, R6E, sec. 31, Saline County, 9 September 1975 (N=23)

11. Little Saline River, 3.5 mi E Stonefort, T10S, R5E, sec. 35, Saline County, 1 August 1973 (N=15)


13. South Fork Saline River, 1 mi S New Dennison, T10S, R3E, sec. 3, Williamson County, 28 October 1974 (N=10)

14. Sugar Creek, .5 mi E Creal Springs, T10S, R3E, sec. 25SE, Williamson County, 28 September 1989 (N=1)

15. Sugar Creek, .5 mi ESE Creal Springs, T10S, R3E, sec. 25, Williamson County, 12 August 1976 (N=8); 9 October 1977 (N=22)

16. Sugar Creek, 1 mi SE Creal Springs, T10S, R3E, sec. 36SW, Williamson County, 28 September 1989 (N=1)
Appendix 1, continued.

Indiana

1. USNM 14624. Patoka River, Patoka, Gibson County, 14 September 1888 (N=4)

2. USNM 118694. Patoka River, Patoka, Gibson County, 23 June 1931 (N=56)

3. USNM 96137. Bridge to Anderson River, 2 mi. S of Siberia, Perry County, date unknown (N=1)

4. USNM 96101. Hurricane Creek, just E of St. Meinrad, Spencer County, 2 June 1943 (N=2)

5. USNM 96121. trib. to Pigeon Creek, 4 mi. E of Evansville, Vanderburgh County, 2 June 1943 (N=1)


7. INHS 112. trib., Black River (Wabash River Dr.), 1.5 mi W Stewartsville; Posey County, 19 July 1974 (N=8)

8. INHS 119. Locust Creek (Pigeon Creek-Ohio River Dr.), Laubscher Rd. at confluence with unnamed trib., T5S, R11W, sec. 36, Vanderburgh County, 4 October 1990 (N=1)

9. INHS 116. trib., Locust Creek (Pigeon Creek-Ohio River Dr.), 3 mi NW Evansville, Mohr Rd. bridge, T5S, R11W, sec. 36, Vanderburgh County, 4 October 1990 (N=3)
Appendix 2.—Localities Searched in 1993 for *Orconectes indianensis*

**Illinois**

Eagle Creek (Saline River Drainage)
1.5 mi. N of Leamington at defunct bridge crossing
Gallatin County, Illinois
T10S, R8E, sec. 10
26 September 1993
Remarks: *Orconectes indianensis* found, N=2 (known locality from 1988); Habitat: rocky, vegetated stream; very turbid; sand/mud substrate
Other crayfish found: *Cambarus diogenes, Procambarus acutus*

Robinette Creek
at Pounds Hollow
Gallatin County, Illinois
T10S, R8E, sec. 25
26 September 1993
Remarks: *Orconectes indianensis* found, N=3 (known locality from 1974); Habitat: small rocky stream; gravel/cobble/sand substrate
Other crayfish found: *Cambarus diogenes*

Honey Creek (Ohio River Dr.), at Lamb
T11S, R10E, sec. 29,SE;
Hardin County, Illinois
18 April 1993
Remarks: *Orconectes indianensis* found, N=4 and common, not abundant (known locality from 1972, 1973, 1981); 100' above and below bridge searched; Habitat: water low but turbid, smells bad-septic pipe visible; Substrate: gravel 60%, slab stone 20%, sand 20%

Rock Creek
3 mi. S Cadiz
Hardin County, Illinois
T11S, R9E, sec. 29
26 September 1993
Remarks: *Orconectes indianensis* not found (known locality from 1973); Habitat: rocky headwater; boulders/gravel substrate
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

tributary of Rock Creek,
.25 mi. E of Highway 1 on road to Lamb
Hardin County, Illinois
18 April 1993
Remarks: *Orconectes indianensis* not found; Substrate: gravel 80%, slab stone 10%, sand 10%

Sheridan Branch
3 mi. N Cave-in-Rock
Hardin County, Illinois
T11S, R9E, sec. 36
26 September 1993
Remarks: *Orconectes indianensis* found, N=1 (known locality from 1975); Habitat: small rocky headwater; rocks/gravel/sand
Other crayfish found: *Cambarus diogenes, Orconectes immunis*
Clifty Creek (Saline River-Ohio River Drainage)
2 mi. E of New Burnside
Johnson County, Illinois
T11S, R4E, sec. 12
15 July 1993
Remarks: Orconectes indianensis found, N=9 (known locality from 1973); Habitat: small, still, bedrock stream, large rocks, harsh environment
Other crayfish found: none

Burden Creek (Saline River Ohio River Drainage)
2 mi. NE of McCormick
Pope County, Illinois
T11S, R5E, sec. 15
15 July 1993
Remarks: Orconectes indianensis found, N=1 (known locality from 1973); Habitat: rocky headwaters (extremely beautiful locality)
Other crayfish found: none

Little Saline River (Saline River-Ohio River Drainage)
3.5 mi. E of Stone fort
Saline County, Illinois
T10S, R5E, sec. 35
15 July 1993
Remarks: Orconectes indianensis found, N=2 (known locality from 1973) Habitat: large, still stream, mud/sand/gavel bottom, large rocks and vegetation, fairly deep
Other crayfish found: none

Rock Branch Battle Ford Creek (Saline River-Ohio River Drainage)
4 mi. SW of Mitchellsville
Saline County, Illinois
T10S, R6E, sec. 31
15 July 1993
Remarks: Orconectes indianensis not found (known locality from 1975); Habitat: medium sized still stream, mud/sand bottom, abundant aquatic vegetation, large rocks and debris, polluted mostly with oil
Other crayfish found: Cambarus diogenes

Brushy Slough (Wabash River Drainage)
ENE New Haven
White County, Illinois
T7S, R10E, sec. 16
26 September 1993
Remarks: Orconectes indianensis not found (known locality from 1987); Habitat: large, mud-bottomed slough
Other crayfish found: none

South Fork Saline River
1 mi. S of New Dennison
Williamson County, Illinois
T10S, R3E, sec. 3
26 September 1993
Remarks: Orconectes indianensis found, N=3 (known locality from 1954 & 1974); Habitat: very high water; cobble/sand/gravel/mud/substrate
Other crayfish found: Cambarus diogenes, Orconestes virilis
Indiana

Otter Creek (Little Blue River-Ohio River Drainage)
at Mifflin
Crawford County, Indiana
T3S, R1W, sec. 32NW
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, moving, bedrock stream, gravel bottom, large rocks
Other crayfish found: *Orconectes putnami*

tributary of Patoka Lake (Wabash River Drainage)
1.5 mi. SW of Wickliffe
Crawford County, Indiana
T2S, R2W, sec. 8
14 July 1993
Remarks: *Orconectes indianensis* found, N=10; Habitat: small, still stream, sand/gravel bottom, large rocks
Other crayfish found: none

Whiskey Run (Little Blue River-Ohio River Drainage)
1 mi. SW of Marengo
Crawford County, Indiana
T2S, R1E, sec. 12 NW
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, still stream, large rocks
Other crayfish found: *Cambarus diogenes, Orconectes putnami*

Mill Creek (White River-Wabash River Drainage)
2.5 mi. SW of Haysville
Dubois County, Indiana
T1N, R5W, sec. 3NE
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, gravel/mud bottom, polluted and backed up by cow droppings
Other crayfish found: *Orconectes putnami*

tributary of Mill Creek (White River-Wabash River Drainage)
2 mi. S of Haysville
Dubois County, Indiana
T1N, R5W, sec. 2NE
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, lots of saw grass and snails
Other crayfish found: *Orconectes putnami, Orconectes immunis*

tributary of Patoka River
at Ireland
Dubois County, Indiana
T1S, R5W, sec. 19
25 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, polluted by sewage draining into it, mud/sand bottom, logs and debris
Other crayfish found: *Cambarus diogenes*
White River (Wabash River-Mississippi River Drainage)
at Portersville
Dubois County, Indiana
T1N, R5W, sec. 21SW
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: large and deep river, very muddy
Other crayfish found: *Orconectes putnami*

Ditch of Patoka River (Wabash River Drainage)
2 mi. E of Francisco on Route 64
Gibson County, Indiana
T2S, R9W, sec. 22
13 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, mud/sand/gravel bottom
Other crayfish found: *Orconectes immunis*

Tributary of Patoka River
2 mi. E of Kirkville
Gibson County, Indiana
T1S, R7W, sec. 19
25 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, mud/sand/gravel bottom, logs and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Tributary of Patoka River
3.5 mi. W of Wheeling
Gibson County, Indiana
T1S, R10W, sec. 21
25 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, mud bottom, logs and debris; mussels abundant
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Tributary of Patoka River (Wabash River Drainage)
2.5 mi. NE of Princeton
Gibson County, Indiana
T1S, R10W, sec. 33SW
13 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, dried up in most areas, mud/sand/gravel bottom
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Bacon Creek (Patoka River-Wabash River Drainage)
at Bacon
Orange County, Indiana
T1S, R1E, sec. 19 SE
14 July 1993
Remarks: *Orconectes indianensis* found, N=36; Habitat: small, still stream, sand/gravel bottom, large rocks
Other crayfish found: none
French Lick Creek (Lost River-White River Drainage)
3.5 mi. S of French Lick on Route 145
Orange County, Indiana
T1N, R2W, sec.22
14 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, still stream, gravel/sand bottom, large rocks
Other crayfish found: *Orconectes putnami*

tributary of Patoka River (Wabash River Drainage)
5 mi. SW of French Lick
Orange County, Indiana
T1N, R2W, sec. 19
14 July 1993
Remarks: *Orconectes indianensis* found, N=22; Habitat: small, still stream, gravel/sand bottom, large rocks
Other crayfish found: none

Anderson River (Ohio River Drainage)
2 mi. S of Siberia
Perry County, Indiana
T3S, R3W, sec. 34SE
24 June 1993
Remarks: *Orconectes indianensis* found, N=1 (known locality; date unknown); Habitat: mud/sand/gravel bottom, logs and debris
Other crayfish found: *Cambarus diogenes*

Oil Creek (Ohio River Drainage)
at Branchville
Perry County, Indiana
T4S, R1W, sec. 18SW
24 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, clear, rocky stream
Other crayfish found: *Orconectes putnami*

Flat Creek (Patoka River-Wabash River Drainage)
3 mi. NW of Otwell
Pike County, Indiana
T1N, R7W, on Southern part of the divisory line between sections 35 and 36
13 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, mud/sand/gravel bottom
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

tributary of Patoka River (Wabash River Drainage)
1 mi. SW of Glezon on Route 57
Pike County, Indiana
T1S, R8W, sec. 28SW
13 July 1993
Remarks: *Orconectes indianensis* not found; Habitat: small stream, mud/sand/gravel bottom
Other crayfish found: *Cambarus diogenes, Orconectes immunis*
tributary of Patoka River (Wabash River Drainage)
5 mi. W of Pikeville on Highway 257
Pike County, Indiana
T2S, R6W, sec. 30NW
13 July 1993
Remarks: *Orconectes indianensis* found, N=6; Habitat: small still stream, slightly dried up, mud/gravel bottom, large rocks and logs
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

tributary of Patoka River
.25 mi. W of Dubois-Pike County line
Pike County, Indiana
T1S, R6W, sec. 15NW
25 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: polluted stream, mud/sand bottom, logs and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Big Creek (Wabash River Drainage)
at Solitude
Posey County, Indiana
T6S, R13W, sec. 8SW
23 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: moderate moving, channeled creek, mud/sand bottom, large rocks, logs and debris
Other crayfish found: *Orconectes immunis*

tributary of Black River (Wabash River Drainage)
1.5 mi. W of Stewartsville,
Posey County, Indiana
T4S, R13W, sec. 22NW
23 June 1993
Remarks: *Orconectes indianensis* abundant, N=6 (known locality from 1974); Habitat: small, slow-moving creek, mud/sand bottom, large rocks, logs, and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Little Fork Creek (Big Creek-Wabash River Drainage)
2 mi. W of St. Phillips
Posey County, Indiana
T6S, R12W, sec. 22NE
23 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, still creek, mud/sand bottom, large rocks, logs and debris
Other crayfish found: *Orconectes immunis*

McFadden Creek (Ohio River Drainage)
1 mi. NE of Mount Vernon
Posey County, Indiana
T7S, R13W, sec. 4SE
23 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, still creek, mud/sand bottom, large rocks, logs and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis*
Hurricane Creek (Anderson River-Ohio River Drainage)
E of St. Meinrad
Spencer County, Indiana
T4S, R4W, sec. 14SW
24 June 1993
Remarks: *Orconectes indianensis* found, N=5 (known locality from 1943); Habitat: small, still stream, mud/sand/gravel bottom
Other crayfish found: *Orconectes immunis*

tributary of Locust Creek (Pigeon Creek-Ohio River Drainage)
3 mi. NW of Evansville, Mohr. Rd. bridge
Vanderburg County, Indiana
T5S, R11W, sec. 36
23 June 1993
Remarks: *Orconectes indianensis* found, N=5 (known locality from 1990); Habitat: small, still stream, mud/sand bottom, polluted with oil and garbage, large rocks, logs and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Barren Fork (Little Pigeon Creek-Ohio River Drainage)
6 mi. E of Boonville at Route 62 - 161 bridge
Warrick County, Indiana
T5S, R7W, sec. 25SW
24 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: still, medium sized stream, mud/sand/gravel bottom, logs and debris; multiple sunfish nests
Other crayfish found: *Cambarus diogenes, Orconectes immunis*

Big Creek (Wabash River Drainage)
2 mi. W of Lynnville, Route 68 bridge
Warrick County, Indiana
T6S, R8W, sec. 11NE
24 June 1993
Remarks: *Orconectes indianensis* found, N=2; Habitat: small, still stream, mud/sand/gravel bottom, abundant aquatic vegetation, logs and debris
Other crayfish found: none

Cypress Creek (Ohio River Drainage)
3 mi. SW of Boonville
Warrick County, Indiana
T6S, R8W, sec. 9NW
24 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: small, still stream, mud/sand bottom, abundant aquatic vegetation, logs, garbage and debris
Other crayfish found: *Orconectes immunis, Procambarus clarkii*

Pigeon Creek (Ohio River Drainage)
1 mi. E of Elberfeld
Warrick County, Indiana
T4S, R9W, sec. 21NW
24 June 1993
Remarks: *Orconectes indianensis* found, N=1; Habitat: small/medium sized channeled stream, mud/sand bottom, large rocks, logs and debris
Other crayfish found: *Cambarus diogenes, Orconectes immunis, Procambarus acutus*
Otter Creek (Little Pigeon Creek-Ohio River Drainage)
1 mi. E of Greenbrier
Warrick County, Indiana
T4S, R8W, sec. 35SE
24 June 1993
Remarks: *Orconectes indianensis* not found; Habitat: strip-mined area, small, slightly moving stream, mud/sand bottom, logs and debris. Other crayfish found: none